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A SUMMARY OF HORTICULTURAL RESEARCH

AT THE

UNIVERSITY OF MARYLAND*

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Since the beginning of the research work in horticulture in Maryland, there has been an ever-increasing demand to solve problems of the fruit grower, vegetable grower, canner, florist, and nurseryman. As a natural result, a large number of projects have been formulated, many of them now completed, which have rendered worthwhile results of practical value to the horticultural industries as well as to the distributor and consumer of the products. Many of the projects have led into the fundamental aspects of biological research and the facts of scientific worth have accumulated for use in teaching and further research. The types of investigations have included work on variety trials, breeding and selection of better varieties, pollination of fruits, vegetables and flowers, fertilizer effects on the growth and fruiting of horticultural plants in the field and greenhouse, pruning of various trees and plants in relation to plant responses, thinning of fruits, cultural methods in field and greenhouse production, propagation of the various plants, storage behavior of fruits and vegetables, quality of edible fruits and vegetables, spray residue removal, and spray injury of fruits. During the past fifty years a total of 172 research projects have been formulated and actively carried on. Seventy-five regular station bulletins have been published, giving the results of definite value and interest. In addition to the station bulletins, 114 articles in journals have included further results, adding to our horticultural knowledge.

Considering some of the outstanding findings of the research program, it might first be pointed out that hundreds of varieties of fruits, vegetables, and flowers have been carefully studied in trial plantings to determine the adaptability and commercial value of new varieties, thus preventing the waste of money and time of growers on worthless varieties or assisting in the introduction of better varieties.

In the work with fruits, pruning of grapes and peaches has received special attention. The four-cane Kniffin system of training grapes has been found superior to other methods for Maryland conditions. In the pruning of the young grape vine, it was found possible to bring the Concord variety

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into full production in the third season after planting, one year earlier than is accomplished with the usual method. In the selection of the fruiting wood of the Concord grape at pruning time, the most fruitful type of cane proved to be a six to eight-foot length before pruning, with a diameter of pencil-size. With peach trees, a light pruning of young trees instead of the severe pruning usually practiced produced marked advantages in earlier productive age and more fruit. A new system of training the scaffold limb development by shoot removal on the young tree in the first season resulted in a much stronger tree. Commercial rejuvenation or renewal of old peach trees was found by a moderate dehorning of the scaffold limbs in preference to the heavy dehorning often tried with indifferent success. In accordance with tree growth and soil fertility, annual moderate to heavy pruning of bearing trees, with proper use of thinning and cutting, has been successful in maintaining annual yields.

With extensive fertilizer studies on fruits, nitrogen fertilizers have proved of great value through increasing the growth and fruiting of fruit trees over the state, and fall applications have been shown especially desirable, as compared with spring applications, notably with certain of the fertilizer materials. Spreading the fertilizer under the outer spread of branches was preferable to a more concentrated band closer to the trunk of the trees.

As a result of fertilizer studies with strawberry, the fertilizer practice has been modified to avoid some bad effects of spring applications before the fruiting of the beds. Fall applications have been recommended in place of spring applications, especially on early and mid-season varieties.

By means of storage and shipping tests, it was found that fertilizers had no direct effect on the shipping and keeping qualities of peaches, apples, or strawberries, except as larger fruits, which might be produced, would be inferior in these respects.

In attempts to influence the quality of fruits, thinning of fruits has had marked value in increasing the size, color, and edible quality. Soil moisture and tree leaf area determine the development of red color of apples to a large degree. Light is another essential, particularly the blue end of the spectrum with the near ultra-violet and ultra-violet being necessary to color formation. With the strawberry, plant spacing in the beds by removal of excess runner plants has increased size and quality of the berries and greatly increased the yield of varieties that are prolific plant makers.

Breeding of grapes, apples, pears, and peaches has produced some promising seedlings, none of which has been introduced as yet.

Extensive pollination studies with fruits have yielded results in the determination of proper pollenizers for our varieties, which has greatly increased the yields of orchards, some of which were not fruitful until this work was done.

Studies on the physiology of fruit trees have shown that nitrogen in fertilizers applied in the fall of the year is taken into the roots and stored in the larger roots until growth of the top of the tree starts in the following spring. Nitrogen applied in early spring is taken up quickly by the roots and translocated to the tree parts within two or three weeks as shown by chemical analyses of spurs. Shading of an apple tree, reducing the light considerably below normal, inhibits flower bud formation which is correlated with effects on the carbohydrate and nitrogen metabolism of the spurs and twigs. Studies on root distribution and root type in the orchard and in the

nursery indicate that great advances can be made by such studies, both from a practical and scientific viewpoint.

In the field of work with vegetables, a noteworthy achievement has been made in the recent introduction of Maryland Golden Sweet, a new sweet potato of great merit, now grown in great acreage and in great demand. A winter-hardy spinach, recently introduced as Maryland Savoy, meets an often repeated request for a variety that will not winter-kill.

In the culture of vegetable crops for market and canning, many improvements have been made in practices as a result of detailed field studies. Early planting of peas has been found to give best yields and best quality. Late planted peas mature more rapidly and thus timely harvesting to get canning quality is more difficult. In work on rate of seeding, four bushels of pea seed per acre resulted in the greatest yield. Spring plowing for pea production proved to be preferable. Soil fertility appears to be the most important factor governing pea production. Rhubarb responded best to sulphate of ammonia, as a source of nitrogen. Fertilizer applications high in potash and low in nitrogen are shown to be important in sweet potato production. In sweet corn production for canning, high fertility of soil resulted in more rapid maturity and hence restricted harvest season. In determining the effect of soil fertility on tomatoes, yield and canning quality were increased by high soil fertility. Chemical analyses showed that nitrogen and potassium increased in such tomatoes, but not phosphorus. In studies on tomato cracking, variety characteristics were found as to types of cracking. Close planting and development of foliage to shade the fruits was found important, as a means to lessen cracking. Soil moisture variations and evaporating power of the air are other important factors in relation to cracking.

Development of edible quality in parsnips proved to be determined by low temperatures and hence cold storage can be used to advantage on this crop.

In seeking to prevent wintered-over cabbage from shooting to seed instead of forming heads, it was found that the larger the plants are at the

Can We Be Of Assistance?

East Central Fruit Growers Production Credit Association

Hagerstown, Maryland

Organized for benefit of Fruit Growers in their financial
production operations

Organized under the Farm Credit Act of 1933 as a permanent institution for benefit of fruit growers in their financial production operation. Serves the states of Delaware, Maryland, Pennsylvania, Virginia and West Virginia.

time growth is stopped by cold weather, the greater is the tendency to shoot to seed in the spring. A period of low temperature is requisite for flower formation in cabbage, but low temperature is effective only after the plant has accumulated a sufficient weight of reserve foods. Sowing seed as late as possible and making a record sowing five or six days later in the event of a long open autumn, are recommended practices to avoid "seeders." Also, heavy fertilizers should be avoided.

With flowers and ornamental plants work has not been extensive. Double stocks have been produced by selection. Rose pruning can be less severe under greenhouse conditions to increase yield. The forcing of gladiolus in winter can be accomplished earlier by summer storage.

THE STORY OF JOHNNY APPLESEED

(Continued from last issue)

Johnny made himself a hat of pasteboard with a peak over the eyes and put on his old coffee sack, "a very serviceable cloak," as he said, "and as good as any man need wear." He went barefoot unless he happened to be given old brogans in payment for his apple trees, and even then he was likely to give them away to the first travelers he met going west. With his polite manners, alertness and gentleness, there was nothing eccentric about him except his restless energy. No one laughed at the glorified tramp. No doubt the western children ran out to meet him, just as the children of the New England coast used to hail the tin peddlers and essence vendors when they came jingling into the older villages. Men liked his trees and the price of them, "a fip-penny bit," or nothing at all, if the family purse was flat. Every slab door swung open to Johnny on its deerskin hinges, and he brought with him a ray of light such as seldom shone through chink-and-daub walls or windows of greased paper. Sometimes he had zinnia and snap-dragon seeds in his bag for the women, and he helped them plant the evil smelling dog-fennel or may-weed under their cabin windows to keep malaria away from the children; catnip, pennyroyal and rattlesnake root were every day gifts.

A dot for each of John Chapman's nurseries would speckle a map of the central states fairly thickly from the shores of Lake Ontario, Lake Erie and Lake Michigan on the north, to the snake line of the Ohio on the south, and along its many feeding streams. The one other way into this wilderness, besides canoeing up its streams, was by forest paths, first an old Indian trail from Fort Duquesne by Fort Sandusky which had once led to Detroit, and then by his own narrower, freshly blazed trail, where he had to leave horse and saddlebags behind him and carry his leather bag of seeds on his own back through under-brush, cat-briars, fallen timber and spruce thickets which would have torn any mealsack to ribbons by the first rod. For the greater part of the way he made his own "tree trails" by breaking a limb so that the broken part would hang down, but another would soon start fresh growth upwards from the break. The last of such old tree trails could be found in Wisconsin a quarter of a century ago. Through the 166 miles of unbroken forest lying north-northwest from Fort Duquesne to the Black Ford of the Mohican where bears made their coverts, deer roved, and wild hogs rooted, Johnny found his way without a compass, needing only the arrowy sense of direction in his own heart.

Every fall he collected fresh pumice until his own nurseries gave him all the seed he wanted; every spring he planted and transplanted. Summer and

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winter, for forty years, he made the rounds of his orchards, fencing them with brush, cultivating the circles around young trees. No one says a word about Johnny's gathering apples or eating them himself, or staying anywhere long enough for someone to bake a pie.

Johnny traveled sixty miles between sunset and sunrise by paths known to himself alone, to get troops from Camp Douglas to Mount Vernon to protect the Mansfield people, frightened from their corn fields by the threat of an Indian massacre.

John's placid death at 72 was all in his day's work, and in the 46th year of his wilderness planting. He had walked twenty miles on a March day to repair the fence of his young orchard up the St. Joseph River, which had been broken by straying cows, and he just managed to drag his old feet back again to the doorsteps of his friends, the Worths, at Ft. Wayne, in whose home he died the next morning. The day the news of John Chapman's death was told in Washington, General Sam Houston of Texas rose from his seat in Congress to say, "The old man was one of the most useful citizens in the world, in his humble way. He has made a greater contribution to our civilization than we realize. Farewell, dear old eccentric heart! Your labor has been a labor of love, and generations, yet unborn, will rise up and call you blessed."

He was buried in one of the family graveyards above the old canal at Ft. Wayne where the common wooden headboard of the period soon decayed. The Men's Garden Club of America now keeps his memory green with lawns and flowering crabs, honeysuckles and locusts planted about the spot where Johnny who could never sit still all his life long, rests at last.

ANALYSIS OF CHEMICAL FERTILIZER MATERIALS

Pounds in 100 Pounds

	<i>Nitrogen</i>	<i>Phosphoric Acid</i>	<i>Potash</i>	<i>Total Plant-Food</i>
<i>Containing Nitrogen Only</i>				
Nitrate of Soda	15 -16	0	0	15 -16
Sulphate of Ammonia	20.5	0	0	20.5
Cyanamid	20.5-24.7	0	0	20.5-24.7
Urea	46	0	0	46
Calcium Nitrate	17.1	0	0	17.1
(34.2% lime)				
Ammonium Nitrate	35	0	0	35
<i>Containing Phosphoric Acid Only</i>				
Superphosphate	0	14-45	0	14 -45
Basic Slag	0	10-25	0	10 -25
Ground Phosphate Rock	0	18-40	0	18 -40
<i>Containing Potash Only</i>				
Muriate of Potash	0	0	50	50
Sulphate of Potash	0	0	48-50	48 -50
Carbonate of Potash	0	0	15-50	15 -50
Manure Salts	0	0	20-30	20 -30
Kainit	0	0	12-14	12 -14
Kelp Ash	0	0	15-30	15 -30
<i>Containing Nitrogen and Phosphoric Acid</i>				
Bone Black	0.8- 1.6	32-35	0	32.8-36.6
Ammonium Phosphate	13 -20	48	0	61 -20
<i>Containing Nitrogen and Potash</i>				
Nitrate of Potash	12 -14	0	44-46	56 -60
<i>Containing Phosphoric Acid and Potash</i>				
Wood Ashes (fresh)	0	0	4	4
Greensand Marl	0	0	2-8	2 - 8

ANALYSIS OF SOME ORGANIC PLANT FOODS

Containing Nitrogen Only, or Chiefly Nitrogen

	Pounds in 100 pounds				Total
	Nitrogen	Phosphoric Acid	Potash		Plant Food
Dried Blood	9 -14	0	0	9 -14	
Garbage Tankage	2 -10	0	0	2 -10	
Hoofs and Horns	11 -15.5	0	0	11 -15.5	
Hair	8 -11	0	0	8 -11	
Feathers	15	0	0	15	
Castor Pomace	4.1- 6.6	1 - 1.5	1 - 1.5	6.1- 9.6	
Cocoa Cake	2.5	1	2.5	5	
Peat or Muck	1.6- 2.5	0.1- 0.2	0.1- 0.2	1.8- 2.7	
<i>Containing Chiefly Nitrogen and Phosphoric Acid</i>					
Tankage	5 -10	5 -10	4 -15	14 -35	
Meat Meal	10 -11.5	1 - 5	0	11 -16.5	
Bonemeal (raw)	3 - 4	20 -25	0	23 -29	
Bonemeal (steamed)	1.6- 2.5	23 -25	0	24.6-27.5	
Fish scrap (dried)	6.6-10	4 - 8	0	10.6-18	
Fish scrap (acidulated)	6 - 6.6	3 - 6	0	7 -12.6	
Sludge (dried)	4 - 6	2.5- 4	0	6.5-10	
<i>Containing Chiefly Nitrogen and Potash</i>					
Tobacco Stems	1.5- 3.5	0	4 - 9	5.5-12.5	
<i>Containing All Three Elements</i>					
Horse Manure (fresh)	0.5- 0.7	0.3- 0.5	0.5- 0.6	1.3- 1.8	
Cow Manure (fresh)	0.4- 0.5	0.2- 0.3	0.4- 0.5	1 - 1.3	
Sheep Manure (fresh)	0.8- 1	0.4- 0.5	0.6- 1	1.8- 2.5	
Sheep Manure (dried)	2.5	0.7	1.5	4.7	
Pig Manure (fresh)	0.4- 0.8	0.2- 0.4	0.3- 0.4	0.9- 1.6	
Hen Manure (fresh)	0.8- 1.4	0.2- 0.9	0.2- 0.9	1.2- 3.2	
Hen Manure (dried)	1.2	0.4- 2.2	0.5- 1.1	1.9- 5.3	
Cottonseed Meal	6 - 7.5	2 - 3	1.5- 2	9.5-12.5	
Linseed Meal	5 - 6	1.3- 1.8	1.3- 1.4	7.6- 9.2	
Wheat Straw	0.4- 0.5	0.1- 0.2	0.7- 0.8	1.2- 1.5	
Rye Straw	0.5- 0.6	0.2- 0.3	0.8- 0.9	1.5- 1.8	
Oat Straw	0.6- 0.7	0.2	1.1- 1.5	1.9- 2.4	
Marsh Hay	0.9	0.5	2.7	4.1	
Rice Straw	0.6- 0.8	0.1- 0.3	0.4- 1.5	1.1- 2.6	
Wood Shavings	0 - 1	0.1	0.3	0.5	
Corn Stover	0.7- 1	0.3	1 - 1.2	2 - 2.5	
Leaves	0.8	0.2- 0.3	0.3- 0.4	1.3- 1.5	

SPRAY DILUTIONS

With our thoughts all set on picking and packing, this is not the best time to talk of scab sprays. However, some growers lost heavily on scab this year. In the August News-Letter, the work at Purdue Agricultural Experiment Station, by Mr. Burkholder, was reviewed. He found it necessary to spray between heavy rains, and even during light rains, but in such cases, the sprays were weakened or diluted, according to the time required for the material to dry on the leaves. In a recent letter, Mr. Burkholder explained that where leaves would probably dry in an hour, 2 gallons of lime-sulfur per 100 gallons of water was applied. In spraying between heavy showers and during light rains, only 3 quarts of lime-sulfur were used, together with 6 pounds of wettable sulfur. He found no injury, although it sometimes took the leaves from 5 to 8 hours to dry, after spray was applied. This was under Indiana conditions, but gives an idea of the possibilities of spray dilution, according to conditions.

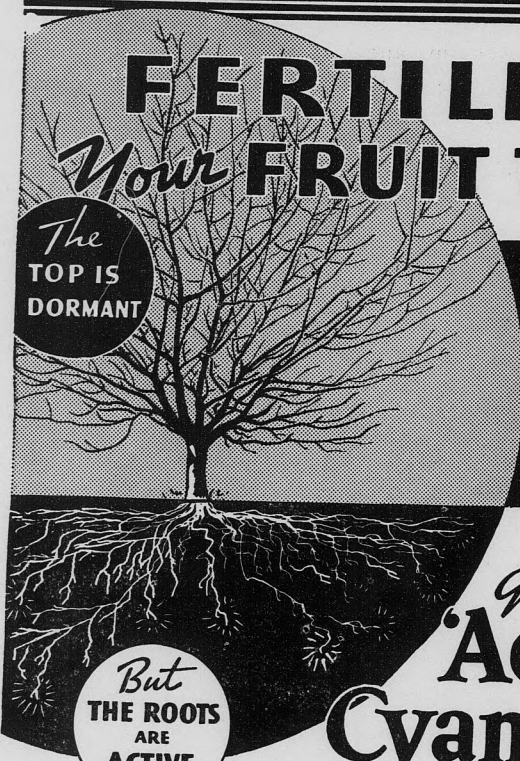
BULLETINS YOU MAY LIKE

- Transit and Storage Diseases of Fruits and Vegetables as Affected by Initial Carbon Dioxide Treatments. Technical Bul. 519—1936. U. S. Department of Agriculture, Washington, D. C. (For sale by Supt. of Documents, Washington, D. C., 5 cents per copy.)
- Connecticut Apples from Tree to Consumer. Bul. 232—1936. Connecticut Agr. Extension Service, Storrs, Conn.
- Growing Black Raspberries and Blackberries in Pennsylvania. Circ. 170—1936. Pennsylvania Agr. Exp. Sta., State College, Pa.
- Starting the Orchard. Circ. 181—1934. Missouri Agr. Exp. Sta., Columbia, Mo.
- The Plum Curculio. Circ. 349—1935. New Jersey Agr. Exp. Sta., New Brunswick, N. J.
- How to Grow Strawberries in Tennessee. Circ. 3—1936. Tennessee Dept. of Agriculture, Nashville, Tenn.
- Soil Moisture and Irrigation Experiments in Eastern Apple Orchards. Technical Bul. 491—1935. U. S. Dept. of Agriculture, Washington, D. C. (For sale by Supt. of Documents, Washington, D. C., 5 cents per copy.)
- Raspberry Growing New York. Circ. 153—1935. N. Y. Agr. Exp. Sta., Geneva, N. Y.
- Top and Double Working Apple Trees. Bul. 432—1936. Wisconsin Agr. Exp. Sta., Madison, Wis.
- Top-Grafting Fruit Trees. Bul. 166—1935. New Hampshire Agr. Extension Service, Durham, N. H.
- Picking, Handling, and Packing Fruits for Market. Special Bul. 169—1935. Minnesota Agr. Extension Service, St. Paul, Minn.
- Bramble Fruits. Circ. 427—1935. Illinois Agr. Extension Service, Urbana, Ill.
- Grape Culture. Circ. 157—1935. Pennsylvania Agr. Extension Division, State College, Pa.
- Filler Apple Trees. Bul. 551—1935. Ohio Agr. Exp. Sta., Wooster, Ohio.
- Orchard Practice. Bul. 47—1934. New Hampshire Agr. Extension Service, Durham, N. H.
- Horticulture at the Ohio Agricultural Experiment Station. Special Circ. 48—1936. Ohio Agr. Exp. Sta., Wooster, Ohio.
- Controlling Fire Blight by Canker Treatment and Spraying. Bul. 208—1936. Purdue Extension Service, La Fayette, Indiana.
- Roadside Markets in Delaware. Bul. 201—1936. Delaware Agr. Exp. Sta., Newark, Del.
- Japanese Beetle Control in Commercial Fruit Plantings. Circ. 366—1936. New Jersey Agr. Exp. Sta., New Brunswick, N. J.
- Bee Keeping. Bul. 158—1936. Purdue Agr. Extension Service, La Fayette, Indiana.

Harriet—Listen, darling, how that apple tree sighs and moans.

Gus—Well, if I was as full of green apples as that tree, I'd sigh and moan too.

To remember something, tie a string around your finger. To forget everything, tie a rope around your neck.



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